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ABSTRACT

This paper suggests one way that trends in the literature might be captured by historians through the use of computerized information retrieval services and particular statistical techniques for analyzing trends. For illustrative purposes, the topic "desegregation" was investigated in Lockheed's DIALOG (1982) information retrieval system utilizing four databases: "ERIC," "Dissertation Abstracts," "Sociological Abstracts," and "Psychological Abstracts." The time period searched was from 1966 to 1980 in each instance. The authors suggest several questions that might be asked about the literature retrieved and present appropriate means of statistically testing these questions. The statistical tests are based on a methodology known as multiple linear regression, a technique which is very appropriate for detecting trends. For example, the first question that might be asked is, "does the literature vary significantly from year to year?" The statistician, in this case, would test the slope of the line on the graph to see whether or not it differs significantly from zero. Questions might also be asked about trends in subtopics. For example, a historical perspective of desegregation, which is a broad and general topic, can be obtained by searching subtopics such as bussing. Looking at more than one subtopic and comparing the slopes of the lines provides a new perspective. Comparisons of literature in different databases can also be made. Using statistical strategies similar to the ones already described, one could compare the output from "ERIC" to that of "Sociological Abstracts." Appendices contain a list of the databases accessible through Lockheed's DIALOG service and in-depth explanations of the statistical tests. (RM)

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HISTORICAL POLICY CAPTURING THROUGH USE OF COMPUTERIZED DATABASES AND TREND ANALYSIS TECHNIQUES

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HISTORICAL POLICY CAPTURING THROUGH THE USE OF COMPUTERIZED DATABASES AND TREND ANALYSIS TECHNIQUES

Introduction

The past, through historians, is continually being revised. When new information is revealed, history gets rewritten. There are now available other techniques that can be utilized by the historical researchers. One could measure trends in particular disciplines, for example. These trends could then provide clues to occurences within the society of that particular period. This would not replace standard historical methodology, but it would provide insights into possible changes over time or differences between groups within society that had heretofore gone unnoticed.

The purpose of this paper is to suggest one way that trends might be captured through the use of computerized information retrieval services and particular statistical techniques.

Historians, Computers, and Statistics

Historians are certainly not strangers to the use of machine processors: the Owsley's, the Bailyn's, and the Aydelotte's, among others in the 1940s and 1950s. Each was drawn to use machine data processing for the same reasons that drive almost all others to it. That is, according to Swierenga (1974), "by an overwhelming body of quantitative data that could be analyzed thoroughly in no other way." Use of the computer as a methodological tool gained little momentum within the social sciences until the late 1960s and the early 1970s. Lack of training, few programs for disciplines other than the hard

sciences, underlying communication barriers between computer center personnel and social scientists, and, to some, the threat of dehumanizing history all have been contributors to the reluctance of large numbers of historians to employ them.

The mid-seventies saw a major increase in the use of computers to process primarily political history through archival records, voting records, census data, tax records, military lists, demographic data files, congressional roll calls, economic reports, etc. (Swierenga, 1974). While computer applications as "counters" and "records managers" has grown, statistical treatment of the data beyond averages and percentages was generally less often used. Swierenga already pointed out in 1970, however, instances of Guttman scaling, factor analysis, and cluster bloc matrices as examples of statistical treatment of historical data. He predicted that before the end of the decade, historians would routinely employ computers to study documents, handle bibliographies and indexes, and simulate historical events.

Not all readily subscribe to such a quantitative analysis in history. First of all, there is no universally accepted definition of "quantitative" history. Aydelotte (1966) refers to the process as the use of data or summaries of data. Swierenga (1974), however, claims that not only data, but a secondary statistical analysis, should be subsumed under quantitative methods. Aydelotte, Bogue, and Fogel (1972) point to one objection raised by some critics, i.e., such "formal" methods can only be applied to a narrow range of problems, not often the most

important ones. Others may expect too much from data analysis. Inconclusive results, errors in measurement, artificially created categories, variables that are not homogeneous, loss of detail by grouping, are some of the negative trade-offs for any potential advantages of systematic, efficient, manipulations of the evidence. One must be aware of the shortcomings mentioned. In the words of Barzun (1977), "The quantified suffer most seriously from the blurring of reality by the definitions required for 'measuring' and the indirectness of the result" (p. 205).

Not all are quite so gloomy. In their book on quantitative methods, Rowney and Graham (1969) point out that relationships emerge from analyzing a set of data that otherwise might not be recognized; or, as they state, "in the sense of involving change through time or departure from the norm, and hence might particularly repay investigation. It [data analysis] can, in this manner, help in defining or restating the historical problem to be studied. Reformulation of one's ideas, testing alternative hypotheses, seeing exceptions to one's theories, all can result from analyzing the data in a systematic way. Jack Greene, in a 1975 New York Times essay, points to the rigor which this "new history" demands. Perhaps he wonders whether quantitative methods require historiographers to go beyond asking, "How do you know that?" to the more demanding question, "How much can plausibly be said on the basis of always imperfect sources?"

Using Information Retrieval Services

Information retrieval services available in most academic libraries provide a potential structure of history in themselves.

They are composed of computer accessible databases already familiar to the historian, e.g. the New York Times Index, History, and History and American Life, etc.

Computer manipulation of these databases not only allows fast, inexpensive access to appropriate articles, but also provides information concerning the number of articles by year. Analysis of trends in the literature between major topic and subtopics (e.g. desegregation, magnet schools, bussing) or between databases representing different groups within society (e.g. education, sociology, journalism) can provide useful insights and starting places for the historian. This perspective can be accomplished much more effectively in terms of time and fiscal resources than was heretofore possible.

Whether or not that literature represents the reality of the time is neither proved nor disproved by the techniques suggested here. But, at the very least, the methods shown here can propose topical areas for the historian to apply traditional methodology. For the purposes of this paper, and growing from the interest of the investigators, the topic of school desegregation was studied. Information retrieval services are described in Appendix A and the specific databases used in the analysis will be described in more detail in the following examples.

Database Analysis Methodology

Central to the quality of the final results are questions concerning the applicability of the information retrieved by the computer search. There are three key issues involved. First, what are the appropriate databases. Second, have the correct

descriptors been selected. And, third, have the descriptors been used consistently by the authors of the database over the time span to be searched. Most information retrieval services allow author, title, descriptor, abstract, and year searching. These services also contain a summary database that predicts which of the component databases will be most productive for a given topic. It has been the authors' experience that a research librarian familiar with the idiosyncracies of the appropriate databases is essential.

Once the above decisions are made, the actual search session can be accomplished. It is possible to just obtain the number of articles on point by year. However, the authors suggest that the set of articles selected by the search pattern be randomly sampled and the abstracts for this sample be printed at the time of the search. This will only increase the cost minimally and will provide a validity check on the search pattern.

For purposes of this paper, "desegregation" was investigated in the DIALOG (1982) information retrieval system utilizing four databases: ERIC, DISSERTATION ABSTRACTS, SOCIOLOGICAL ABSTRACTS, and PSYCHOLOGICAL ABSTRACTS. The time period searched was from 1966 to 1980 in each instance (Table 1).

This information provides a rather crude reflection of the interest in desegregation over time. Relationships among the data are not readily detected when the information is in table

format. It is, however, more understandable when presented in graphic form. The information obtained from the ERIC search is presented graphically in Figure A.

While it appears that there is an increasing production in the literature (and therefore one would suspect an increase in the importance in desegregation among educators), this increase could be due to chance. There are ways of testing whether or not this is a significant (in a statistical sense) relationship.

The investigators suggest several questions that might be asked and present appropriate means of statistically testing these questions. The statistical tests are based on a methodology known as multiple linear regression, a technique which is very appropriate for detecting trends (Newman, 1975).

Explanations of the statistical tests has been relegated to the Appendices. This was done in part to maintain the readability of the paper relative to a non-statistically oriented audience and also because it is the belief of the authors that if the historian can formulate the question of interest, he or she can then employ a statistician to develop and do the statistical analysis.

Possible Questions About the Literature Within a Database

The information obtained from an analysis of the production by year curve of a particular discipline's databases on a given topic can be used in two different contexts. First, if one is interested in the limited question of that particular discipline's interest in the topic at hand, the graph presents direct evidence. Second, and perhaps more important, the curve can

provide clues as to occurrences in the larger society. It is with this second application that this paper is concerned.

Trends in Production. In exploring the results of the computer search, the first question that might be asked is, "does the literature vary significantly from year to year?" The statistician, in this case, would test the slope of the line on the graph to see whether or not if differs significantly from zero. If it does, this might indicate that academic interest as represented by the ERIC database was either increasing or decreasing (depending on the graph) over the time period studied.

The above question was tested by the authors and it was determined that the slope was significantly different from zero ($p = .0003$). By noticing that the graph was increasing over time, it was concluded that academic interest in desegregation, as represented by ERIC, was increasing over this time period. The statistical analysis for this question is presented in Appendix B.

A second question that might be asked is "has the interest in the topic peaked or bottomed out?" This may be of particular importance when investigating databases over a long period of time. Note, for example, that productivity on desegregation peaked in 1978 in the ERIC database. Again, however, we are faced with the question of whether or not the trend around the 1980 figure is chance fluctuation or statistically significant. If the data is statistically significant, then there is a methodology available for determining the date of inflection (Fisher and Ziebur, 1961).

The above question was tested by the authors, and it was determined that a significant curvilinear relation existed ($p < .00$). By noting the graph, it was concluded that academic interest in desegregation, as represented by ERIC, reached a peak somewhere around 1978. This was done visually. However, as noted earlier, there are mathematical methods available. The statistical analysis for this question is presented in Appendix B.

It is possible when describing the trends on a topic over a long period of time (e.g. Dissertation Abstracts is searchable back to 1895) that the question of interest may have peaked and bottomed out several times. In order to identify this possibility, the data should first be graphed, and a visual count of the points of inflection obtained. The question of whether these are chance fluctuations must then be tested. If this test is not significant, a test of the next fewer numbers of changes in the direction of the curve should be run and so on until the maximum number of possible changes has been tested. This will determine the number of fluctuations that can be attributed to something other than chance. The dates at which the fluctuations occurred can then be calculated using the methodology cited above.

The methodology presented above would provide an understanding of the changes in production of the literature on the topic of interest that could be attributed to something other than chance. If there are fluctuations that are significantly different from chance,the historian might suspect occurences within society which are either independently or collectively

related to the fluctuation point. In this instance the historian might search for two categories of events: (1) causes - those relating to the cause of the change; and (2) effects - those related to the fact that something did occur.

The technique presented above focused on the insights that might be gained using the literature production curve of the main topic of interest. However, the same methodology would also allow for an exploration of subtopics in relation to a central theme.

Trends in Subtopics. A historical perspective of a particular blanket term such as desegregation, which is a broad and general topic, can often be obtained by searching out other related topics, or subtopics; that is, topics that one might include as a part of the broader topic. Insofar as "desegregation" is concerned, looking at a topic such as "bussing" is a logical move. Using the previously described strategies, the frequency of subtopic entries over time can provide a rough view of trends.

For example, the subtopic of "bussing" might show a different profile of frequency over time. In essence, the researchers could ask the same questions about the subtopic "bussing" as about the general topic "desegregation". Secondly, looking at more than one subtopic and comparing the slopes of the lines provides a new perspective. Specifically, one could ask such questions as: (1) Does the shape of the subtopic graph differ significantly from the shape of the general topic graph? If it does, this might suggest that the relationship of the subtopic to the

main topic changed over time. And (2) How do the number of entries of different subtopics differ from one another? For example, is the output on "bussing" significantly increasing or decreasing compared to the output on "magnet schools? If they are significantly different, this would suggest that something happened within society that is related to the shift. Armed with this knowledge, the historian could search for such events.

The graph of the data on "bussing" and "magnet schools" and their relation to "desegregation" is presented in Figure 2. This graph is based on the literature production counts obtained from ERIC for the 1966 to 1980 period.

As suggested above, analysis of the data would begin by determining the number of significant changes in the rate of production (number of significant changes in direction in the curve) for each topic. This would provide the historian insight into the time frames that should be explored.

After each of the curves have been analyzed independently, the relationships between subtopic curves and between subtopic curves and main curves should be explored. That is, "do the graphs cross and is this crossing statistically different from parallel?" Statisticians refer to this as interaction. If there is statistically significant interaction, then the historian might suspect occurrences within society which are either independently or collectively related to the increase/decrease in the first graph and/or the increase/decrease in the second graph. In this instance the historian might search for two categories of

events: (1) causes - those relating to the cause of the trends; and (2) effects - those relating to the fact that something did occur.

Appendix B presents regression models that could be used to test interactions. These models assume that the trends in sub-topics are linear over time. Other models could be written which would test for interaction of curvilinear trends over time.

Possible Questions About the Literature Between Databases

The strategies described thus far can be applied to data derived from more than one database. For example, one could compare the output from ERIC to that of SOCIOLOGICAL ABSTRACTS. In each instance, the nature of the graphs would be explored independently and then possible interactions would be explored. Questions similar to those framed above could be asked concerning increasing or decreasing production, points of inflection, and interactions. The models presented in Appendix B can be used to test these questions (assuming the trends were linear).

The importance of comparing the shapes of the curves in two or more databases centers on the information they can provide. To the extent that they are similar, the historian might be more certain that something affecting both databases did occur in the larger society. A judicious choice of the databases used can even increase this certainty.

It is important to note a limitation of this particular application. It is not possible to compare absolute numbers of entries because the number of journals, and year covered, as well as number of articles in journals, differs by discipline.

Further, one cannot compare the magnitude of the effect within sociology to the effect within education because the assumption that each article has an equal impact is not a viable one. What is possible, however, is to compare the shapes of the lines over time. A crude indicator of each discipline's interest in desegregation might be suggested, at the very least.

Conclusions

The questions that have been generated for this paper concern trends in the literature. These questions can best be explored by multiple linear regression (McNeil, Kelly, McNeil, 1975). One should realize that other questions can be asked. For example, if one had a theory of "causal" events and their relation to other events path analysis (Newman & Dye, 1982) or component analysis (Newman and Newman, 1975) would be an appropriate analytical technique. Another example would be a concern for the clustering of events. This might be explored through factor (Haraman, 1967; Rummel, 1970) or cluster (Evert, 1974; Garfield, 1981) analysis. One could explore, for example, what journals, production and time intervals cluster together. Another set of questions could be generated that relate to profile or Q-factor analysis (Nunnally, 1978). Here, for example, one could explore the characteristics of leaders at different times.

The above techniques all attempt to describe what "happened". The methodology we propose is different. It is suggested as a tool to help decide where to begin to look. In

effect, it provides the historian with an deductive methodology to compliment the normal inductive processes traditionally used.

It is important to understand that there are several limitations. First of all, computerized databases do not necessarily reflect the real world, but they do provide a particular frame of reference that can be tapped in productive ways. Second, databases are prepared and managed with varying degrees of accuracy, differing underlying philosophies, and a wide range of standards of acceptance. It is important for the researcher to explore each database and be cognizant of its limitations and strengths. With the above limitations in mind, the historian can utilize the suggested methodology to explore the nature of literary production on general topics and logical subtopics over time.

References

Aydelotte, W. O. Quantification in history. American Historical Review, April 1966, 71, 805-806.

Aydelotte, W. O., Bogue, A. G. & Fogle, R. W. The dimensions of quantitative research in history. Princeton, NJ: Princeton University Press, 1972.

Barsun, J. & Graff, H. F. The modern researcher. New York: Harcourt-Brace-Jovanovich, Inc., 1977.

_____. BRS system reference manual. Scatia, NY: Bibliographic Retrieval Services, Inc., 1979.

_____. Database catalogue's DIALOG information retrieval service. Palo Alto, CA: DIALOG Information Services, Inc., 1982.

Everitt, B. Cluster analysis. London: Heinemann Education Books, 1974.

Fisher, R. C. & Ziebur, A. D. Calculus and analytic geometry. Englewood Cliffs, NJ: Prentice Hall, Inc., 1961.

Garfield, E. The 1980 Nobel prizewinners. Current Contents, August 1981, 12(31).

Greene, J. P. The "new history": From top to bottom. New York Times, January 8, 1972, 37.

Harman, H. H. Modern factor analysis (2nd ed., rev.). Chicago: University of Chicago Press, 1967.

McNeil, K. A., Kelly, F. J. & McNeil, J. T. Testing research hypotheses using multiple linear regression. Carbondale, IL: Southern Illinois University Press, 1975.

Newman, I. Demonstration of multiple regression models that will facilitate the investigation of trends and functional relationships. In I. Newman and C. R. Benz, Multiple Linear Regression: Readings, Exams, Problems, Syllabus. Akron, OH: American Educational Research Association Multiple Linear Regression Special Interest Group, 1979.

Newman, I. & Dye, C. M. Path analysis: Another research tool for the educational historian. Journal of the Midwest History of Education Society, 1982.

Newman, I. & Newman, C. A discussion of component analysis: Its intended purpose, strengths, and weaknesses. Multiple Linear Regression Viewpoints, April 1975, 5(4).

Nunnally, J. C. Psychometric theory. New York: McGraw-Hill Book Co., 1978.

Rowney, D. K. & Graham, J. K. (Eds.). Quantitative history: Selected readings in the quantitative analysis of historical data. Homewood, IL: Dorsey Press, 1969.

Rummel, R. J. Applied factor analysis. Evanston, IL: Northwestern University Press, 1970.

Swierenga, R. P. Computers and American history: The impact of the "new generation". The Journal of American History, March 1974, 1045-1070.

APPENDIX A

INFORMATION RETRIEVAL SERVICES

The two information retrieval services most often available in research libraries are DIALOG (1982) and BRS (1979). In each instance, they index over 100 individual databases.

Presented below are the databases available through DIALOG (1982) together with pertinent information concerning costs, connect time and print rates. A concise description of each database, including number of journals indexed, total number of individual records in the database, and the earliest and latest loading dates is available in Data Base Catalogue's DIALOG Information Retrieval Service (1982).

File No.	DATABASE (Supplier)	Online Connect Time Rate $/Hour	Offline Print Rate Per Full Record
	MULTIDISCIPLINARY AND CURRENT AFFAIRS		
102	★ ASI (Congressional Information Service, Inc.)	$90	15¢
88	BIOGRAPHY MASTER INDEX (Gale Research Company)	55	15
137	★ BOOK REVIEW INDEX (Gale Research Company)	55	15
163	CAREER PLACEMENT REGISTRY/STUDENT (Career Placement Registry)	50	$1.50
410	CHRONOLOG NEWSLETTER (DIALOG Information Retrieval Service)	15	15¢
101	CIS (Congressional Information Service, Inc.)	90	25
35	COMPREHENSIVE DISSERTATION INDEX (Univ. Microfilms International)	55	12
77	CONFERENCE PAPERS INDEX (Cambridge Scientific Abstracts)	73	20
135	★ CONGRESSIONAL RECORD ABSTRACTS (Capitol Services Int'l.)	75	15
411	DIALINDEX™ (DIALOG Information Retrieval Service)	35	na
200	DIALOG PUBLICATIONS (DIALOG Information Retrieval Service)	15	15
114	ENCYCLOPEDIA OF ASSOCIATIONS (Gale Research Company)	45	25
20	FEDERAL INDEX (Capitol Services International)	90	20
136	FEDERAL REGISTER ABSTRACTS (Capitol Services Int'l.)	75	20
26	FOUNDATION DIRECTORY (The Foundation Center)	60	30
27	FOUNDATION GRANTS INDEX (The Foundation Center)	60	30
66	GPO MONTHLY CATALOG (U.S. Government Printing Office)	35	10
166	GPO PUBLICATIONS REFERENCE FILE (U.S. Government Printing Office)	35	10
85	GRANTS DATABASE (Oryx Press)	60	30
150	LEGAL RESOURCE INDEX (Information Access Corp.)	90	20
47	MAGAZINE INDEX (Information Access Corp.)	75	20
180	★ MARC (U.S. Library of Congress)	To be announced	
78	NATIONAL FOUNDATIONS (The Foundation Center)	60	30
111	NATIONAL NEWSPAPER INDEX (Information Access Corporation)	75	20
211	NEWSEARCH (Information Access Corporation)	95	20
911	NEWSEARCH (Information Access Corporation) subscriber	na	na
170	ONLINE CHRONICLE (Online, Inc.)	35	30
49	PAIS INTERNATIONAL (Public Affairs Information Service, Inc.)	60	15
190	★ REMARC (Carrollton Press)	To be announced	
65	SSIE CURRENT RESEARCH (Smithsonian Science Info. Exchange)	78	20

File No.	DATABASE (Supplier)	Online Connect Time Rate $/Hour	Offline Print Rate Per Full Record
	SCIENCE		
110	AGRICOLA 1970–1978 (U.S.D.A. Technical Information Systems)	$35	10¢
10	AGRICOLA 1979–present (U.S.D.A. Technical Information Systems)	35	10
55	BIOSIS PREVIEWS 1969–1976 (Biosciences Information Service)	58	15
5	BIOSIS PREVIEWS 1977–present (Biosciences Information Service)	58	15
2	CA SEARCH 1967–1971 (American Chemical Society)	64	20
3	CA SEARCH 1972–1976 (American Chemical Society)	64	20
104	CA SEARCH 1977–1979 (American Chemical Society)	64	20
4	CA SEARCH 1980–1981 (American Chemical Society)	64	20
311	CA SEARCH 1982–present (American Chemical Society)	64	20
174	CHEMICAL REGULATIONS AND GUIDELINES SYSTEM (U.S. Interagency Regulatory Liaison Group; CRC Systems, Inc.)	70	90
31	CHEMNAME™ (Chemical Abstracts Service, DIALOG Information Retrieval Service)	130	20
30	CHEMSEARCH™ (Chemical Abstracts Service, DIALOG Information Retrieval Service)	130	20
328	CHEMSIS™ 1967–1971 (Chemical Abstracts Service, DIALOG Information Retrieval Service)	130	20
131	CHEMSIS™ 1972–1976 (Chemical Abstracts Service, DIALOG Information Retrieval Service)	130	20
130	CHEMSIS™ 1977–present (Chemical Abstracts Service, DIALOG Information Retrieval Service)	130	20
50	CAB ABSTRACTS (Commonwealth Agricultural Bureaux)	50	30
172	EXCERPTA MEDICA 1974–1979 (Excerpta Medica)	70	20
72	EXCERPTA MEDICA 1980–present (Excerpta Medica)	70	20
73	EXCERPTA MEDICA IN PROCESS (Excerpta Medica)	70	20
58	GEOARCHIVE (Geosystems)	70	20
89	GEOREF (American Geological Society)	70	20
151	HEALTH PLANNING AND ADMINISTRATION (U.S. National Library of Medicine)	35	15
12	INSPEC 1969–1976 (Institution of Electrical Engineers)	75	25
13	INSPEC 1977–present (Institution of Electrical Engineers)	75	25
76	LIFE SCIENCES COLLECTION (Cambridge Scientific Abstracts)	45	15
152	MEDLINE 1966–1974 (U.S. National Library of Medicine)	35	15
153	MEDLINE 1975–1979 (U.S. National Library of Medicine)	35	15
154	MEDLINE 1980–present (U.S. National Library of Medicine)	35	15
29	METEOROLOGICAL AND GEOASTROPHYSICAL ABSTRACTS (American Meteorological Society and NOAA)	95	15
204	ONTAP™ CA SEARCH (American Chemical Society)	15	na
231	ONTAP™ CHEMNAME (American Chemical Society)	15	na
188	★ SCISEARCH® 1965–1969 (Institute for Scientific Information) subscriber	65	15
188	★ SCISEARCH® 1965–1969 (Institute for Scientific Information) nonsubscriber	165	15
187	★ SCISEARCH® 1970–1973 (Institute for Scientific Information) subscriber	65	15
187	★ SCISEARCH® 1970–1973 (Institute for Scientific Information) nonsubscriber	165	25
186	SCISEARCH® 1974–1977 (Institute for Scientific Information) subscriber	65	15
186	SCISEARCH® 1974–1977 (Institute for Scientific Information) nonsubscriber	165	25
94	SCISEARCH® 1978–1980 (Institute for Scientific Information) subscriber	65	15
94	SCISEARCH® 1978–1980 (Institute for Scientific Information) nonsubscriber	165	25
34	SCISEARCH® 1981–present (Institute for Scientific Information) subscriber	65	15

★Forthcoming database

File No.	DATABASE (Supplier)	Online Connect Time Rate $/Hour	Offline Print Rate Per Full Record
95	RAPRA ABSTRACTS (Rubber and Plastics Research Association of Great Britain)	$65	15¢
113	STANDARDS & SPECIFICATIONS 1950–present (National Standards Association, Inc.)	65	25
115	SURFACE COATINGS ABSTRACTS (Paint Research Association of Great Britain)	65	15
63	TRIS (U.S. Department of Transportation and Transportation Research Board)	40	10
117	WATER RESOURCES ABSTRACTS (U.S. Dept. of the Interior)	45	15
99	WELDASEARCH (The Welding Institute)	65	15
33	WORLD ALUMINUM ABSTRACTS (American Society for Metals)	50	10
67	WORLD TEXTILES (Shirley Institute)	55	10
	SOCIAL SCIENCES & HUMANITIES		
9	AIM/ARM (Center for Vocational Education)	25	10
38	AMERICA: HISTORY & LIFE (ABC-Clio, Inc.)	65	15
56	ARTBIBLIOGRAPHIES MODERN (ABC-Clio, Inc.)	60	15
64	CHILD ABUSE AND NEGLECT (Natl. Cntr. for Child Abuse and Neglect)	35	10
171	★ CRIMINAL JUSTICE PERIODICALS INDEX (University Microfilms International)	55	15
1	ERIC (Educational Resources Information Center)	25	10
54	EXCEPTIONAL CHILD ED. RESOURCES (Council for Except. Children)	25	10
39	HISTORICAL ABSTRACTS (ABC-Clio, Inc.)	65	15
36	LANGUAGE & LANGUAGE BEHAVIOR ABS. (Sociol. Abs., Inc.)	55	15
61	LISA (Learned Information Ltd.)	50	10
86	★ MENTAL HEALTH ABSTRACTS (National Clearinghouse for Mental Health Information, National Institute of Mental Health)	30	10
71	MLA BIBLIOGRAPHY (Modern Language Association)	55	15
21	NCJRS (National Criminal Justice Reference Service)	35	15
46	NICEM (National Information Center for Educational Media)	70	20
70	NICSEM/NIMIS (National Info. Cntr. for Special Education Materials)	35	10
201	ONTAP™ ERIC	15	na
57	PHILOSOPHER'S INDEX (Philosophy Documentation Center)	55	15
91	POPULATION BIBLIOGRAPHY (University of North Carolina, Carolina Population Center)	55	10
11	PSYCINFO (American Psychological Assoc.)	65	10
97	RILM ABSTRACTS (City University of New York, International RILM Center)	65	15
7	SOCIAL SCISEARCH® (Institute for Scientific Information) nonsubscriber	110	20
7	SOCIAL SCISEARCH® (Institute for Scientific Information) subscriber	75	15
37	SOCIOLOGICAL ABSTRACTS (Sociological Abstracts, Inc.)	55	15
93	U.S. POLITICAL SCIENCE DOCUMENTS (Univ. of Pittsburgh, Cntr. for International Studies)	65	15
120	U.S. PUBLIC SCHOOL DIRECTORY (National Center for Educational Statistics)	35	10
167	★ WORLD AFFAIRS REPORT (California Institute of International Affairs)	90	25
	BUSINESS/ECONOMICS		
	Bibliographic		
15	ABI/INFORM (Data Courier, Inc.)	73	30
43	ADTRACK (Corporate Intelligence, Inc.)	95	25

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APPENDIX B

STATISTICAL STRATEGIES OF TRENDS ANALYSIS

TREND TEST METHODOLOGY

The statistical tests for the various trends can all be accomplished by using multiple linear regression and model comparison techniques (McNeil, Kelly, & McNeil, 1975). Below are the models that would be necessary to test the various types of trends. For each trend test, full and restricted models are written, the multiple R^2 computed and the R^2s are used to calculate an F-test value according to the following formula:

$$F = \frac{(R^2_F - R^2_R)/df_N}{(1 - R^2_F)/df_D}$$

where: F = value of F for the F-test

R^2_F = Multiple R^2 for the full model

R^2_R = Multiple R^2 for the restricted model

df_N = Degrees of freedom numerator

df_D = Degrees of freedom denominator

The following sections represent regression models appropriate for testing the various types of trends discussed in this paper.

Test for Linear Relationship Within a Database

The following could be used to determine if there was a significant linear relationship between production of literature on point and time.

Full Model: $Y = a_oU + a_1T + E$

Restricted Model: $Y = a_oU + E$

where: Y = number of entries

T = year

E = error vector, $Y - Y$

a_o, a_1 = partial regression weights

Test for Curvilinear Relationship within a Database

The following models could be used to determine if there was a significant curvilinear relationship between production of literature on point and time.

Full Model: $Y = a_o u + a_1(T) + a_2(T)^2 + E$

Restricted Model: $Y = a_o u + a_1(T) + E$

where: Y = number of entries

T = year

T^2 = year squared

E = error vector, $Y - Y$

a_o, a_1, a_2 = partial regression weights

Test for Linear Interactions

The following models could be used to determine if there was a significantly linear relationship over time between production from two different topics.

Full Model: $Y = a_o u + a_1(T_1) + a_2(T_2) + a_3(D_1) + a_4(D_2) + E$

Restricted Model: $Y = a_o u + a_1(T_1) + a_2(T_2) + a_3(D) + E$

where: Y = number of entries

T_1 = 1 if entry under topic 1, 0 otherwise

T_2 = 1 if entry under topic 2, 0 otherwise

D_1 = year of T_1 entry

D_2 = year of T_2 entry

D = year $(D_1 + D_2)$

E = error vector, Y - Y

a_o . . . a_4 = partial regression weights

FIGURE A

Number of Articles in ERIC by Year

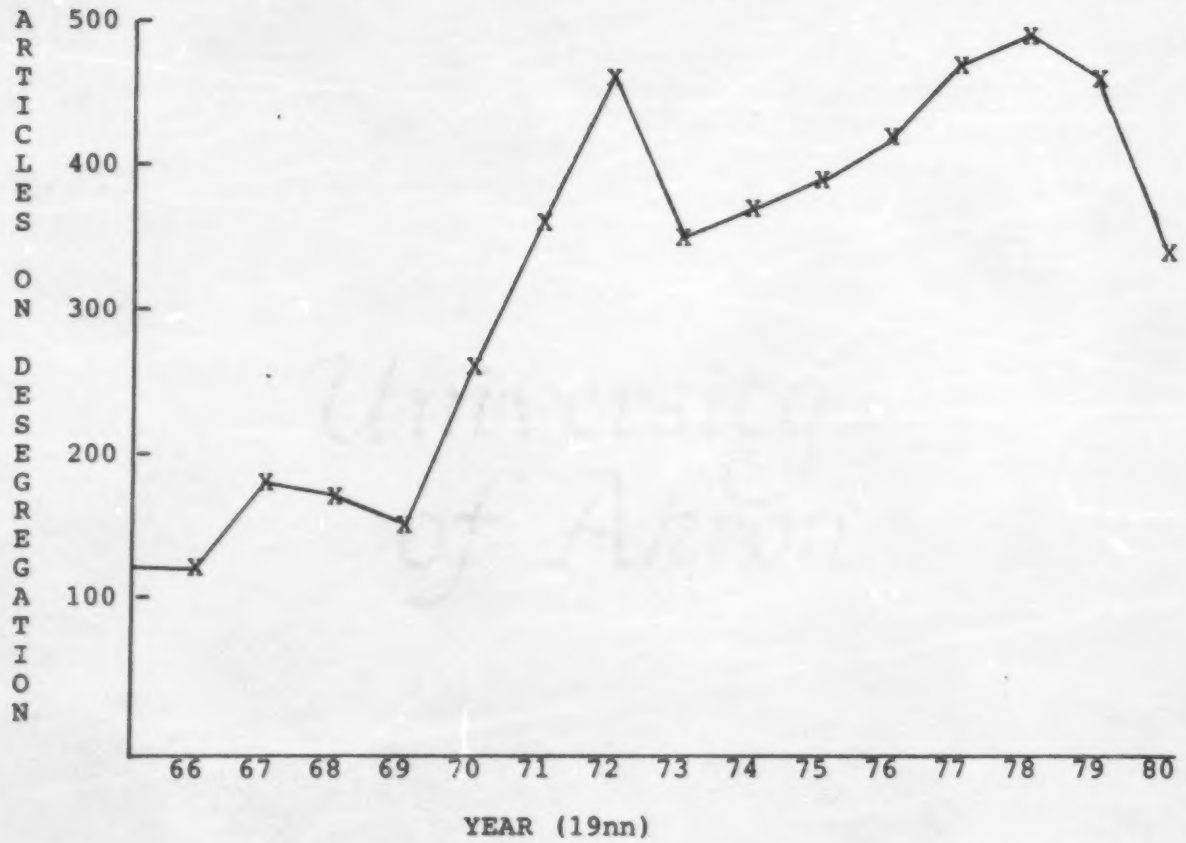

FIGURE B

Number of Desegregation, Bussing, and Magnet School Articles in ERIC by Year

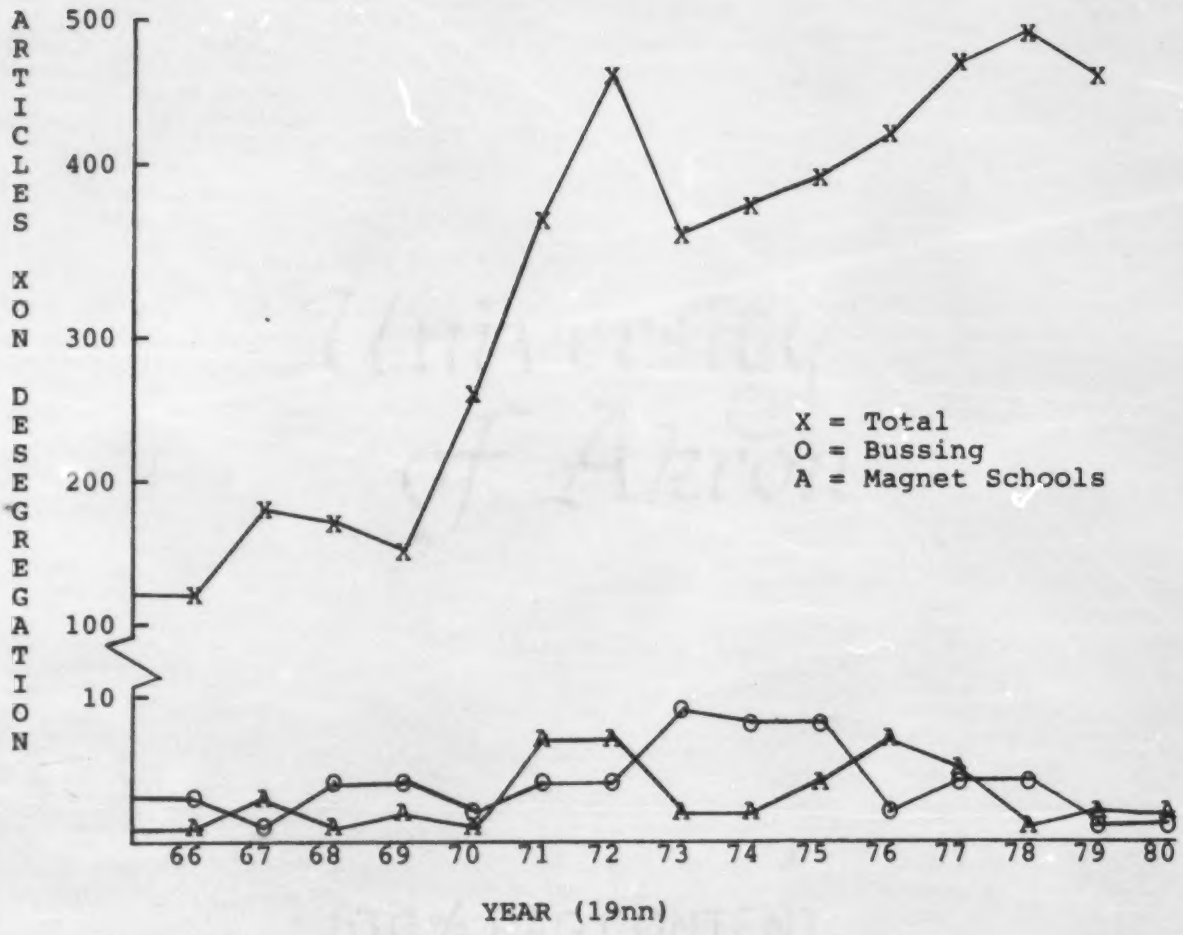

TABLE 1

Desegregation Literature Indexed by
Various Databases

Year	ERIC	SOC. AB.[a]	DISSERT. AB.[b]	PSYC.[c] AB.
1966	114	7	7	7
1967	193	18	8	29
1968	186	7	9	35
1969	167	9	18	42
1970	254	12	22	38
1971	360	11	26	49
1972	433	18	20	63
1973	358	27	16	85
1974	362	42	28	102
1975	364	51	13	109
1976	410	54	27	9
1977	449	62	11	112
1978	487	73	36	115
1979	437	21	28	75
1980	305	5	15	71

Notes

[a]Sociological Abstracts
[b]Dissertation Abstracts
[c]Psychological Abstracts